

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

DITHANE* F-45 RAINSHIELD FUNGICIDE

Effective Date: 08-Feb-10
Product Code: 88812
MSDS: 07800

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Dithane* F-45 Rainshield Fungicide

COMPANY IDENTIFICATION:

Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Yellow liquid with a sulfur odor. May cause eye and skin irritation. Toxic to aquatic organisms.

EMERGENCY PHONE NUMBER: 800-992-5994

3. COMPOSITION/INFORMATION ON INGREDIENTS:

Mancozeb:	CAS # 008018-01-7	37%
[[1,2-ethanedithiolbis(carbamodithioato]](2-)]manganese mixture with [[1,2-ethanedithiolbis(carbamodithioato]](2-)]zinc		
Balance, Total, Including:		63%
Calcium Lignosulfonate	CAS # 008061-52-7	
Ethylene Thiourea	CAS # 000096-45-7	
Hexamethylene Tetramine	CAS # 000100-97-0	

4. FIRST AID:

EYES: Flush eyes thoroughly with water for several minutes. Remove contact lenses after initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

SKIN: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. Discard items which cannot be decontaminated, including leather articles such as shoes, belts, and watchbands.

INGESTION: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Never give anything by mouth to an unconscious person.

INHALATION: Move person to fresh air; if effects occur, consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES:

FLASH POINT: Non-combustible
METHOD USED: Not applicable

FLAMMABLE LIMITS:

LFL: Not determined
UFL: Not determined

EXTINGUISHING MEDIA: When product is involved in a fire use carbon dioxide, dry chemical, or water spray. Contain run-off. Use water spray to cool containers exposed to fire.

FIRE & EXPLOSION HAZARDS: Dried product can burn. Pesticide particulates can become airborne. Combustion generates toxic fumes of the following: hydrogen sulfide, carbon disulfide, sulfur oxides, nitrogen oxides and carbon oxides.

FIRE-FIGHTING EQUIPMENT: Wear positive pressure self-contained breathing apparatus with full protective clothing. Remain upwind. Avoid breathing smoke.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS/LEAKS: Absorb small spills with inert material such as sand, earth, Zorbal. Transfer liquids and solid diking material to separate suitable containers for recovery or disposal. Report large spills to Dow AgroSciences at 800-992-5994.

Appropriate protective equipment must be worn when handling a spill of this material. If exposed to material during clean-up operations, remove all contaminated clothing promptly. Wash all exposed skin areas with soap and water immediately after exposure. Thoroughly launder clothing before reuse. Do not take clothing home to be laundered.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

HANDLING: Do not handle material near food, feed or drinking water.

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STORAGE: Do not store this material near food, feed or drinking water. Store in a well-ventilated area. Keep container tightly closed when not in use. Keep from freezing; material stability may be affected. The maximum recommended storage temperature for this material is 120°F (49°C).

OTHER: Triple rinse (or equivalent) and puncture empty container. Dispose empty container in a sanitary landfill or as allowed by state and local authorities.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINE:

Mancozeb: Dow AgroSciences Industrial Hygiene Guide is 1 mg/M³, dermal sensitizer. AIHA WEEL is 1 mg/M³, dermal sensitizer.

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guideline.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

EYE/FACE PROTECTION: Use safety glasses.

SKIN PROTECTION: Use gloves chemically resistant to this material.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. If respiratory irritation is experienced, use a NIOSH approved air-purifying respirator.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES:

BOILING POINT: 212°F (100°C) water
MELTING POINT: 32°F (0°C) water
VAPOR PRESSURE: 17 mmHg @ 68°F (20°C) water
VAPOR DENSITY: <1 water
SOLUBILITY IN WATER: Dispersible
SPECIFIC GRAVITY: 1.3 to 1.4
APPEARANCE: Yellow liquid
ODOR: Sulfur
PERCENT VOLATILITY: 53 to 55% water
pH: 5 to 7
VISCOSITY: 200 to 1000 CPS
EVAPORATION RATE: <1 water

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Material is stable under normal storage conditions. Avoid temperatures above 120°F (49°C).

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) Avoid contact with oxidizing agents and acids.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition may yield the following: carbon disulfide and hydrogen sulfide.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

POTENTIAL HEALTH EFFECTS: This section includes possible adverse effects, which could occur if this material is not handled in the recommended manner.

EYES: May cause slight eye irritation.

SKIN: Brief contact may cause slight skin irritation with local redness. Skin contact may cause an allergic skin reaction in a small proportion of individuals. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD₅₀ for skin absorption in rabbits is >5000 mg/kg.

INGESTION: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. The oral LD₅₀ for rats is >5000 mg/kg.

INHALATION: Mist may cause irritation of the upper respiratory tract (nose and throat) and lungs.

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SYSTEMIC (OTHER TARGET ORGAN) EFFECTS:

Mancozeb, in animals, effects have been reported on the following organs: thyroid, liver, nervous system and eyes.

CANCER INFORMATION: Mancozeb has caused cancer in laboratory animals.

TERATOLOGY (BIRTH DEFECTS): Mancozeb has caused birth defects in laboratory animals only at doses toxic to the mother.

REPRODUCTIVE EFFECTS: In animal studies, mancozeb did not interfere with reproduction.

MUTAGENICITY: For mancozeb, in-vitro genetic toxicity studies were predominantly negative. Animal genetic toxicity studies were negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING: No relevant information found.

DEGRADATION & PERSISTENCE:

Based on information for mancozeb.
The photolysis half-life in soil is <2 days.

ECOTOXICOLOGY:

Based on information for mancozeb.
Material is very highly toxic to aquatic organisms on an acute basis (LC₅₀ or EC₅₀ is <1 mg/L in most sensitive species tested).
Acute LC₅₀ in rainbow trout (*Oncorhynchus mykiss*) is 2.2 ppm.
Acute LC₅₀ in channel catfish (*Ictalurus punctatus*) is 5.2 ppm.
Acute Immobilization EC₅₀ in water flea (*Daphnia magna*) is 3.8 mg/L.
Acute LC₅₀ in bluegill (*Lepomis macrochirus*) is 2.04 mg/L.
Acute LC₅₀ in water flea (*Daphnia magna*) is 1.0 mg/L.
Growth inhibition EC₅₀ in green alga (*Selenastrum capricornutum*) is 0.063 mg/L.
Maximum acceptable toxicant concentration (MATC) in fish early life-stage study is 0.00316 mg/L.
Maximum acceptable toxicant concentration (MATC) in water flea (*Daphnia magna*) is 0.0094 mg/L.

Acute LC₅₀ in saltwater mysid (*Mysidopsis bahia*) is 0.067 mg/L.
Acute LC₅₀ in sheepshead minnow (*Cyprinodon variegatus*) is 1.5 mg/L.
Acute EC₅₀ for shell deposition inhibition in eastern oyster (*Crassostrea virginica*) is 2.01 mg/L.
Material is practically non-toxic to birds on a dietary basis (LC₅₀ is >5000 ppm).
Dietary LC₅₀ in mallard (*Anas platyrhynchos*) is >6400 ppm.
Dietary LC₅₀ in Japanese quail (*Coturnix coturnix japonica*) is approx. 42,000 ppm.
Material is practically non-toxic to birds on an acute basis (LD₅₀ is >2000 mg/kg).
Acute oral LD₅₀ in mallard (*Anas platyrhynchos*) is 6400 mg/kg.

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: Do not contaminate food, feed, or water by storage or disposal. Wastes are toxic. Improper disposal of excess waste, spray mixture, or rinsate is a violation of federal law. Spray mixture or rinse water that can't be used according to label instructions, must be disposed of in accordance with applicable local, state or federal requirements. Contact your state pesticide or environmental control agency, or the hazardous waste representative at the nearest EPA regional office for guidance.

14. TRANSPORT INFORMATION:

DOT Non-Bulk
NOT REGULATED

DOT Bulk
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name: MANCOZEB
Hazard Class: 9 **ID Number:** UN3082
Packing Group: PG III

IMDG
Proper Shipping Name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
Technical Name: MANCOZEB
Hazard Class: 9 **ID Number:** UN3082
Packing Group: PG III
EMS Number: F-A,S-F
Marine pollutant.: Yes

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ICAO/IATA

Proper Shipping Name: ENVIRONMENTALLY
HAZARDOUS SUBSTANCES, LIQUID, N.O.S
Technical Name: MANCOZEB
Hazard Class: CLASS 9 **ID Number:** UN 3082
Packing Group: PG III
Cargo Packing Instruction: 914
Passenger Packing Instruction: 914

Additional Information

MARINE POLLUTANT (MANCOZEB)

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
Ethylene Thiourea	000096-45-7	<0.1%
Mancozeb	008018-01-7	36%
Generic Group Name for Mancozeb:		
Ethylenebisdithiocarbamic Acid (CAS # 000111-54-6)		

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard
A delayed health hazard

CALIFORNIA PROPOSITION 65: The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986:

This product contains trace levels of a component known to the state of California to cause cancer, birth defects, or other reproductive harm. The component is Ethylene thiourea (000096-45-7)

This product contains a component known to the state of California to cause cancer. The component is Mancozeb (008018-01-7)

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
Ethylene Thiourea	000096-45-7	PA1 PA2 PA3
Ethylenebisdithiocarbamic Acid	000111-54-6	PA1 PA3

PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).
PA2=Pennsylvania Special Hazardous Substance (present at greater than or equal to 0.01%).
PA3=Pennsylvania Environmental Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Health	1
Flammability	1
Reactivity	0

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**COMPREHENSIVE ENVIRONMENTAL RESPONSE
COMPENSATION AND LIABILITY ACT (CERCLA, or
SUPERFUND):** This product contains the following
substance(s) listed as "Hazardous Substances" under
CERCLA, which may require reporting of releases:

Chemical Name	CAS#	RQ	% in Product
Ethylene Thiourea	000096-45-7	10 lbs.	0.1%
Mancozeb	008018-01-7	5000 lbs.	36%

Generic Group Name for Mancozeb:
Ethylenebisdithiocarbamic Acid (CAS # 000111-54-6)

16. OTHER INFORMATION:

MSDS STATUS: Revised Sections: 2, 3, 4, 11, 14 & 15
Reference: DR-0370-4196
Replaces MSDS Dated: 20-Dec-04
Document Code: D03-822-004
Replaces Document Code: D03-822-003

The Information Herein Is Given In Good Faith, But No
Warranty, Express or Implied, Is Made. Consult Dow
AgroSciences for Further Information.